AMENDMENT OF THE SPECIFICATION:

Please replace paragraph [0015] with the following amended paragraph:

[0015] Referring to FIG. 1 and FIG. 2, a representative CT imaging system 1 is shown, including a gantry 2 having an x-ray source 4, a radiation detector array 6, a patient support structure 8 and a patient cavity 10, wherein the x-ray source 4 and the radiation detector array 6 are opposingly disposed so as to be separated by the patient cavity 10. In an exemplary embodiment, a patient 12 is disposed upon the patient support structure 8, which is then disposed within the patient cavity 10. The x-ray source 4 projects an x-ray beam 14 toward the radiation detector array 6 so as to pass through the patient 12. In an exemplary embodiment, the x-ray beam ~~16~~14 is collimated by a collimate (not shown) so as to lie within an X-Y plane of a Cartesian coordinate system referred to as an "imaging plane". After passing through and becoming attenuated by the patient 12, the attenuated x-ray beam 16 is received by the radiation detector array 6. In an exemplary embodiment, the radiation detector array 6 includes a plurality of detector elements 18 wherein each of said detector elements 18 receives an attenuated x-ray beam 16 and produces an electrical signal responsive to the intensity of the attenuated x-ray beam 16.

Please replace the paragraph [0020] with the following amended paragraph:

[0020] An exemplary embodiment of the present invention utilizes multiple x-ray images over the organ of interest in an interleaving fashion while performing CT scanning. Lower x-ray energy levels are known to be effective in imaging soft tissue (e.g., lipids) while higher x-ray energy levels are known to be effective in imaging high-density structures (e.g., calcified plaques). An exemplary embodiment includes one thousand views in half a second gantry rotation, resulting in two views per millisecond being produced. Using the exemplary waveform 300 depicted in FIG. 3, and assuming that the frequency of the kilovolt modulation waveform is also one thousand hertz, one view at the 140 kilovolt (kV) x-ray energy level and another at the 80 kV x-ray energy level would be produced every millisecond. For the generation of images at each kV setting, it would be desirable to have at least two hundred and forty degrees of data. At the end of the scan period, five hundred views of the 140 kV data and five hundred views of the 80kV data would be produced. In an exemplary embodiment, in order to obtain the misregistration effects from a two successive scan approach. In addition, using the interleaving approach can result in dose savings compared to performing two separate scans.

Please replace paragraph [0024] with the following amended paragraph:

[0024] In an exemplary embodiment, a composite image can be created by subtracting the non-contrast dataset from the contrast-enhanced dataset as shown in column 424 of FIG. 4. The resulting image can be used for viewing contrast enhanced anatomy. Subtracting the first set of image data 402 from the fourth set of image data 408 results in a seventh set of image data 414 that includes contrast enhanced anatomy only (calcified plaque removed). Subtracting the second set of image data 404 from the fifth set of image data 410 results in an eighth set of image data 416 that includes contrast enhanced anatomy only (calcified plaque removed). Subtracting the third set of image data 406 from the sixth set of image data 412 results in a ninth set of image data 418 that includes plaque characterization with the hard plaque and other non-contrast enhanced anatomy removed. Additional composite images obtained from both set of views (e.g., with the contrast agent and without the contrast agent) can be used to understand plaque characteristics. In an exemplary embodiment, the difference images 406, 412, 418 could be viewed on the display screen 40 once the scanning is complete. The processing device 32 can include instructions for creating and displaying the data in the matrix 400.

Please replace the paragraph [0025] as the following amended paragraph:

[0025] FIG. 5 is a block diagram of an exemplary method for post processing image data using an embodiment of the present invention. The process depicted in FIG. 5 can be used to localize and quantify soft tissue or non-calcified plaque using a contrast image. At step 502, vessel segmentation is performed. Vessel segmentation includes determining the location of the vessel of interest. Next, at step 504, vessel tracking is performed including following the flow of a contrast agent from the beginning of the vessel and plotting the diameter of the vessel to determine where the flow narrows and widens. Vessel tracking can be performed using a high x-ray energy level and a contrast agent as shown in box 410 of FIG. 4. An output from step 504 includes a curve reformat image 506. Next, at step 508, the volume of plaque is quantified by looking at the soft plaque absorption coefficient or HUs. An input to step 508 includes the curve reformat image 506. Quantifying the plaque and determining plaque characterizations can be performed using the difference between the low<u>er</u> x-ray energy level ~~408~~ <u>304</u> and the high<u>er</u> x-ray energy level ~~410~~ <u>302</u> as depicted in box 412 of FIG. 4. In this manner the structure of the plaque can be analyzed. Output from step 508 includes data describing the statistical make-up of the region of interest 510 (e.g., histogram plot of the HU numbers and contour plot). The data describing the statistical make-up of the region of interest 510 is input to step 512. Step 512 performs an identification, or localization, of the soft plaque. Output from this step includes a curve reformat image highlighting regions where the soft, or vulnerable, plaque is located 514. In an exemplary embodiment, the highlights are in color over the original curve reformat image 506.

Please replace the paragraph [0028] with the following amended paragraph:

[0028] ~~In an exemplary embodiment, a composite image can be created by subtracting the non-contrast dataset from the contrast-enhanced dataset as shown in column 424 of FIG. 4. The resulting image can be used for viewing contrast enhanced anatomy. Subtracting the first set of image data 402 from the fourth set of image data 408 results in a seventh set of image data 414 that includes contrast enhanced anatomy only (calcified plaque removed). Subtracting the second set of image data 404 from the fifth set of image data 410 results in an eighth set of image data 416 that includes contrast enhanced anatomy only (calcified plaque removed). Subtracting the third set of image data 406 from the sixth set of image data 412 results in a ninth set of image data 418 that includes plaque characterization with the hard plaque and other non-contrast enhanced anatomy removed. Additional composite images obtained from both set of views (e.g., with the contrast agent and without the contrast agent) can be used to understand plaque characteristics. In an exemplary embodiment, the difference images 406 412 418 could be viewed on the display screen 40 once the scanning is complete. The processing device 32 can include instructions for creating and displaying the data in the matrix 400.~~ Although the preceding embodiments are discussed with respect to medical imaging, it is understood that the image acquisition and processing methodology described herein is not limited to medical applications, but may be utilized in non- medical applications. In addition, the preceding embodiments are discussed with respect to cardiac applications, it is understood that the image acquisition and processing methodology described herein is not limited to cardiac applications, but may be utilized in non-cardiac applications.

Please replace the paragraph [0029] as the following amended paragraph:

[0029] ~~FIG. 5 is a block diagram of an exemplary method for post processing image data using an embodiment of the present invention. The process depicted in FIG. 5 can be used to localize and quantify soft tissue or non-calcified plaque using a contrast image. At step 502, vessel segmentation is performed. Vessel segmentation includes determining the location of the vessel of interest. Next, at step 504, vessel tracking is performed including following the flow of a contrast agent from the beginning of the vessel and plotting the diameter of the vessel to determine where the flow narrows and widens. Vessel tracking can be performed using a high x-ray energy level and a contrast agent as shown in box 410 of FIG. 4. An output from step 504 includes a curve reformat image 506. Next, at step 508, the volume of plaque is quantified by looking at the soft plaque absorption coefficient or HUs. An input to step 508 includes the curve reformat image 506. Quantifying the plaque and determining plaque characterizations can be performed using the difference between the lower x-ray energy level 304 and the higher x-ray energy level 302 as depicted in box 412 of FIG. 4. In this manner the structure of the plaque can be analyzed. Output from step 508 includes data describing the statistical make-up of the region of interest 510 (e.g., histogram plot of the HU numbers and contour plot). The data describing the statistical make-up of the region of interest 510 is input to step 512. Step 512 performs an identification, or localization, of the soft plaque. Output from this step includes a curve reformat image highlighting regions where the soft, or vulnerable, plaque is located 514. In an exemplary embodiment, the highlights are in color over the original curve reformat image 506.~~ <u>As described above, the embodiments of the invention may be embodied in the form of computer-implemented</u>

processes and apparatuses for practicing those processes. Embodiments of the invention may also be embodied in the form of computer program code containing instructions embodied in tangible media, such as floppy diskettes, CD-ROMs, hard drives, or any other computer-readable storage medium, wherein, when the computer program code is loaded into and executed by a computer, the computer becomes an apparatus for practicing the invention. An embodiment of the present invention can also be embodied in the form of computer program code, for example, whether stored in a storage medium, loaded into and/or executed by a computer, or transmitted over some transmission medium, such as electrical wiring or cabling, through fiber optics, or via electromagnetic radiation, wherein, when the computer program code is loaded into and executed by a computer, the computer becomes an apparatus for practicing the invention. When implemented on a general-purpose microprocessor, the computer program code segments configure the microprocessor to create specific logic circuits.